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NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing
(day/month/year) **21-03-2005**

Applicant's or agent's file reference

WO 36757

IMPORTANT NOTIFICATION

International application No.

PCT/IB2002/005531

International filing date (day/month/year)

19-12-2002

Priority date (day/month/year)

Applicant

Nokia Corporation
et al

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see Also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference WO 36757		FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/IB2002/005531	International filing date (day/month/year) 19-12-2002	Priority date (day/month/year) -	
International Patent Classification (IPC) or national classification and IPC H04Q7/38, H04L12/28			
Applicant Nokia Corporation et al			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>10</u> sheets, as follows:</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 13-07-2004		Date of completion of this report 15-03-2005	
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/IB2002/005531

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1 - 28 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- pages _____ as originally filed/furnished
- pages* _____ as amended (together with any statement) under Article 19
- pages* 1 - 10 received by this Authority on 18.01.2005
- pages* _____ received by this Authority on _____
- ☒ the drawings:
- pages 1 - 3 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>1-43</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-43</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-43</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The claimed invention relates to an improvement of the mechanism used for communication connection changeover decisions in wireless frequency multi-band networks.

Reference is made to the following documents:

D1: GB 2 373 966 A

D2: WO 99/05873 A1

The document D1 is regarded as being the closest prior art to the subject-matter of independent claims 1, 14, 27 and 35, and discloses (See page 3, line 4-line 19; page 3, line 25-page 4, line 20; page 6, line 24-line 31; page 7, line 17-line 21; page 9, line 28-page 10, line 5; page 10, line 20-line 24; page 11, line 11-line 24): A system, method and a communication device comprising a distributed radio concept, wherein communication information associated with a first network may be transmitted to/from a node belonging to a second network. Wireless devices are adapted to communicate with any of the two networks and can also communicate with each other via WPAN (Wireless Personal Area Network). The communication information may comprise network configuration, neighbour cell lists, loading level etc. The retrieved information is to be used when determine whether to handover to another network, frequency carrier and/or air interface mode (page 3, line 25-page 4, line 19).

D2 (See page 7, line 17-page 8, line 3; page 8, line 13-line 20), discuss a hand-off procedure based on pilot signal strength. The document also suggest that a signal strength is detected from a received beacon signal. In addition it is suggested that this signal strength is compared to a predetermined threshold.

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

Both D1 and D2 fail to discuss the use of beacon packets for broadcasting of multi frequency band information via access nodes.

This way of distributing information related to communication connection capability of a transmitting access node provides for a decision on a communication connection changeover to an available frequency in a way which is not considered obvious to the person skilled in the art.

What is claimed in the amended, independent claims 1,13,25 and 32, as well as the dependent claims 2-12, 14-24,26-31 and 33-43 is novel, is considered to involve an inventive step, and have industrial applicability.

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Enclosure of January 18, 2005

PCT-Application No.: PCT/IB02/05531

Applicant: Nokia Corporation

Our ref.: WO 36757

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NEW CLAIMS 1 to 43

1. Method of deciding on performing a communication connection changeover of a subscriber terminal (T1) in a wireless communication network comprising at least one access node (AP1, AP2, AP3), wherein said subscriber terminal is able to communicate with an access node in said wireless communication network on two or more frequency bands,
- said method comprising the steps of:
- detecting communication information from said at least one access node, said communication information comprising information indicating whether the at least one access node is capable to communicate on two or more frequency bands;
- transmitting said communication information from said at least one access node to said subscriber terminal by broadcasting said communication information from said at least one access node to said subscriber terminal incorporated in a beacon packet;
- processing the transmitted communication information and determining a communication connection capability of the transmitting access node on the basis of the frequency band information; and
- using the processing result for a decision on a communication connection changeover of the subscriber terminal.
2. Method according to claim 1, wherein said wireless communication network is a WLAN, preferably based on an IEEE 802.11 standard.

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3. Method according to claim 2, wherein said two or more frequency bands comprise a frequency band of 2.4 GHz and one or more frequency bands between 5 and 6 GHz.

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4. Method according to any of the preceding claims, wherein said information in said communication information comprise a multiple band indicator related to the transmitting access node.

10

5. Method according to any of the preceding claims, wherein said information in said communication information comprise a traffic load indicator related to the frequency bands of the transmitting access node.

15

6. Method according to any of the preceding claims, wherein said information in said communication information comprise a frequency band coverage indicator related to frequency bands of neighboring access nodes of the transmitting access node in the wireless communication network.

20

7. Method according to any of the preceding claims, wherein said information in said communication information comprise a frequency channel indicator for indicating the frequency channel used by the access node at the respective frequency band.

25

8. Method according to any of the preceding claims, wherein said processing step further comprises steps of detecting a signal strength indicator on a predetermined frequency band; and

30

comparing the detected signal strength indicator with a predefined threshold value, wherein the result of the comparison indicates an estimation of the connection capability of an access node on another frequency band.

35

9. Method according to any of the preceding claims, wherein the decision on a communication connection changeover is made by the subscriber terminal.

5

10. Method according to any of the preceding claims, wherein a result of the decision on a communication connection changeover of the subscriber terminal is a change of the communication connection from the present frequency band to another frequency band which is common to the subscriber terminal and the access node associated with the subscriber terminal.

10

11. Method according to any of claims 1 to 9, wherein a result of the decision on a communication connection changeover of the subscriber terminal is a change of the communication connection from the current access node to a specific frequency band of a neighboring access node which is common to the subscriber terminal and the neighboring access node to be associated with the subscriber terminal.

15

20

12. Method according to any of the preceding claims, wherein communication information transmitted from two or more access node in the wireless communication network are processed in said processing step.

25

13. System for deciding on performing a communication connection changeover of a subscriber terminal (T1) in a wireless communication network comprising at least one access node (AP1, AP2, AP3), wherein said subscriber terminal is able to communicate with an access node in said wireless communication network on two or more frequency bands,

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said system comprising:

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means for detecting and transmitting communication information from said at least one access node to said subscriber terminal, said communication information comprising information indicating whether the transmitting access node is capable to communicate on two or more frequency bands, wherein said means for detecting and transmitting the communication information of the access node are adapted to incorporate the communication information in a beacon packet broadcasted to said subscriber terminal;

means for processing the transmitted communication information so as to determine a communication connection capability of the transmitting access node on the basis of the frequency band information; and

means for deciding on a communication connection changeover of the subscriber terminal by using the processing result.

14. System according to claim 13, wherein said wireless communication network is a WLAN, preferably based on an IEEE 802.11 standard.

15. System according to claim 14, wherein said two or more frequency bands comprise a frequency band of 2.4 GHz and one or more frequency bands between 5 and 6 GHz.

16. System according to any of claims 13 to 15, wherein said information in said communication information comprise a multiple band indicator related to the transmitting access node.

17. System according to any of claims 13 to 16, wherein said information in said communication information comprise a traffic load indicator related to the frequency bands of the transmitting access node.

18. System according to any of claims 13 to 17, wherein said information in said communication information comprise a frequency band coverage indicator related to frequency bands of neighboring access nodes of the transmitting access node in the wireless communication network.

19. System according to any of claims 13 to 19, wherein said information in said communication information comprise a frequency channel indicator for indicating the frequency channel used by the access node at the respective frequency band.

20. System according to any of claims 13 to 19, further comprising means for detecting a signal strength indicator on a predetermined frequency band; wherein said means for processing are adapted to compare the detected signal strength indicator with a predefined threshold value, the result of the comparison indicating an estimation of the connection capability of an access node on another frequency band, and said means for deciding on a communication connection changeover are adapted use the result of said comparison.

21. System according to any of claims 13 to 20, wherein the means for deciding on a communication connection changeover is located in the subscriber terminal.

22. System according to any of claims 13 to 21, wherein the means for deciding on a communication connection changeover are adapted to decide to change the communication connection from the present frequency band to another frequency band which is common to the subscriber terminal and the access node associated with the subscriber terminal.

23. System according to any of claims 13 to 21, wherein the means for deciding on a communication connection changeover are adapted to decide to change the communication

5 connection from the current access node to a specific frequency band of a neighboring access node which is common to the subscriber terminal and the neighboring access node to be associated with the subscriber terminal.

10 24. System according to any of claims 13 to 23, wherein the means for processing the transmitted communication information are adapted to process communication information transmitted from two or more access node in the wireless communication network.

15

25. Access node in a wireless communication network, said access node communicating with at least one subscriber terminal wherein said subscriber terminal is able to communicate with the access node on two or more frequency

20 bands,

said access node comprising:

means for detecting and transmitting communication information to said subscriber terminal, said communication information comprising information indicating whether the

25 access node is capable to communicate on two or more frequency bands, wherein said means for detecting and transmitting the communication information are adapted to incorporate the communication information in a beacon packet broadcasted to said subscriber terminal.

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26. Access node according to claim 25, wherein said wireless communication network is a WLAN, preferably based on an IEEE 802.11 standard.

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27. Access node according to claim 26, wherein said two or more frequency bands comprise a frequency band of 2.4 GHz and one or more frequency bands between 5 and 6 GHz.

5 28. Access node according to any of claims 25 to 27, wherein said information in said communication information comprise a multiple band indicator related to the access node.

10 29. Access node according to any of claims 25 to 28, wherein said information in said communication information comprise a traffic load indicator related to the frequency bands of the access node.

15 30. Access node according to any of claims 25 to 29, wherein said information in said communication information comprise a frequency band coverage indicator related to frequency bands of neighboring access nodes of the access node in the wireless communication network.

20 31. Access node according to any of claims 25 to 30, wherein said information in said communication information comprise a frequency channel indicator for indicating the frequency channel used by the access node at the respective
25 frequency band.

32. Subscriber terminal communicating in a wireless communication network comprising at least one access node (AP1, AP2, AP3), wherein said subscriber terminal is able
30 to communicate with an access node in said wireless communication network on two or more frequency bands, said subscriber terminal comprising:
means for receiving communication information transmitted from at least one access node, said
35 communication information comprising information indicating

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whether the transmitting access node is capable to communicate on two or more frequency bands, and being transmitted from said at least one access node to said subscriber terminal by broadcasting said communication information from said at least one access node to said subscriber terminal incorporated in a beacon packet;

5 means for processing the transmitted communication information so as to determine a communication connection capability of the transmitting access node on the basis of
10 the frequency band information; and

means for deciding on a communication connection changeover of the subscriber terminal by using the processing result.

15 33. Subscriber terminal according to claim 32, wherein said wireless communication network is a WLAN, preferably based on an IEEE 802.11 standard.

20 34. Subscriber terminal according to claim 33, wherein said two or more frequency bands comprise a frequency band of 2.4 GHz and one or more frequency bands between 5 and 6 GHz.

25 35. Subscriber terminal according to any of claims 32 to 34, wherein said means for receiving the communication information means of the access node are adapted to extract the communication information from a beacon packet broadcasted from the access node.

30 36. Subscriber terminal according to any of claims 32 to 35, wherein said information in said communication information comprise a multiple band indicator related to the transmitting access node.

37. Subscriber terminal according to any of claims 32 to 36, wherein said information in said communication information comprise a traffic load indicator related to the frequency bands of the transmitting access node.

5

38. Subscriber terminal according to any of claims 32 to 37, wherein said information in said communication information comprise a frequency band coverage indicator related to frequency bands of neighboring access nodes of the transmitting access node in the wireless communication network.

10

39. Subscriber terminal according to any of claims 32 to 38, wherein said information in said communication information comprise a frequency channel indicator for indicating the frequency channel used by the access node at the respective frequency band.

15

40. Subscriber terminal according to any of claims 32 to 39, further comprising means for detecting a signal strength indicator on a predetermined frequency band; wherein said means for processing are adapted to compare the detected signal strength indicator with a predefined threshold value, the result of the comparison indicating an estimation of the connection capability of an access node on another frequency band, and said means for deciding on a communication connection changeover are adapted use the result of said comparison.

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41. Subscriber terminal according to any of claims 32 to 40, wherein the means for deciding on a communication connection changeover are adapted to decide to change the communication connection from the present frequency band to another frequency band which is common to the subscriber

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terminal and the access node associated with the subscriber terminal.

42. Subscriber terminal according to any of claims 32 to
5 40, wherein the means for deciding on a communication
connection changeover are adapted to decide to change the
communication connection from the current access node to a
specific frequency band of a neighboring access node which
is common to the subscriber terminal and the neighboring
10 access node to be associated with the subscriber terminal.

43. Subscriber terminal according to any of claims 32 to
42, wherein the means for processing the transmitted
communication information are adapted to process
15 communication information transmitted from two or more
access node in the wireless communication network.

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